Cisco SPA3102 Phone Adapter with Router
Cisco Small Business Voice Gateways and ATAs

Intelligent Call-Routing Gateway for VoIP

Highlights

- Enables high-quality, feature-rich voice-over-IP service through your broadband Internet connection
- Two standard phone ports: one for use with an analog telephone or fax machine and one for an analog FXO connection from your local service provider
- High-quality, clear-sounding voice service with advanced quality-of-service capability
- Compatible with common telephone features, such as caller ID, call waiting, call forwarding, and voicemail

Figure 1.   Cisco SPA3102 Phone Adapter with Router

Product Overview

The Cisco® SPA3102 Phone Adapter with Router (Figure 1) features the ability to connect standard telephones and fax machines to an IP-based data network, with the additional benefit of an integrated connection for legacy telephone network "hop-on, hop-off" applications. SPA3102 users will be able to extend the use of their broadband phone service by automatically routing local calls from mobile phones and landlines to voice over IP (VoIP) service providers, and vice versa. If power is lost to the unit or Internet service is down, calls can be redirected to a traditional carrier via the FXO interface.

A user calling from a mobile phone or landline will be able to reduce and even eliminate international and long-distance telephone charges by first calling the Cisco SPA3102 via a local telephone number. The advanced authentication and call-routing intelligence programmed into the

SPA3102 will route the call via the Internet to the end destination. In addition, when using a SPA3102 at the far end, VoIP calls placed to that location can be either answered or further processed and routed on as local calls to any legacy land line or mobile phone.

The Cisco SPA3102 supports one RJ-11 basic telephone FXS port to connect an existing analog phone or fax machine. It also supports one public switched telephone network (PSTN) FXO port to connect to a telephone company (Telco) or private branch exchange (PBX) circuit. The SPA3102 also includes two 100BASE-T RJ-45 Ethernet interfaces to connect to a home or office LAN, as well as an Ethernet connection to a broadband modem or router. The FXS and FXO lines can be configured independently via software controlled by the service provider or the end user.

Installed by the end user and remotely provisioned, configured, and maintained by the service provider, each Cisco SPA3102 converts voice traffic into data packets for transmission over an IP network. Compact in design, the SPA3102 can be used in consumer and business VoIP service offerings, including a full-featured IP Centrex environment. The SPA3102 uses international standards for voice and data networking for reliable voice and fax operation.

Features

Toll-quality voice and carrier-grade feature support: The Cisco SPA3102 delivers clear, high-quality voice communication in diverse network conditions. Excellent voice quality in a demanding IP network is achieved via the advanced implementation of standard voice coding algorithms. The SPA3102 is interoperable with common telephony equipment such as voicemail, fax, PBX, and interactive voice response systems.

Large-scale deployment and management: The Cisco SPA3102 enables service providers to provide customized VoIP services to their subscribers. It can be remotely provisioned and supports dynamic, in-service software upgrades. A highly secure profile upload saves providers the time and expense of managing and preconfiguring or reconfiguring customer premises equipment (CPE).

Ironclad security: Cisco understands that security for end users and service providers is a fundamental requirement for a solid, carrier-grade telephony service. The Cisco SPA3102 supports highly secure, standard encryption-based methods for communication, provisioning, and servicing.

Telephony Features

- Service authentication via PIN, digest, and caller ID (Bellcore Type 1)
- Per-call authentication and associated routing
- Support for least-cost routing
- Impedance agnostics: eight settings
- Call waiting, cancel call waiting, call waiting caller ID detection (Bellcore Type 1)
- Caller ID with name and number (multinational variants)
- Caller ID blocking
- Call forwarding to PSTN or VoIP service: no answer, busy, all
- Do not disturb
- Call transfer
- Three-way conference calling with local mixing

- Message waiting indication - visual and tone based
- Call return
- Call back on busy
- Call blocking with toll restriction
- Delayed disconnect
- Distinctive ringing - calling and called number
- Off-hook warning tone
- Selective/anonymous call rejection
- Hot line and warm line calling
- Speed dialing of eight numbers/addresses
- Music on hold
- Fax: G.711 pass-through or real-time fax over IP via T.38

Product-Specific Features

- VoIP to PSTN (USA) service call origination and termination
- PSTN (USA) to VoIP service call origination and termination
- Single-stage and two-stage dialing
- Forward calls to VoIP service - selective, authenticated, all
- Forward calls to PSTN service - selective, authenticated, all
- PSTN line sharing with multiple extensions
- Automatic PSTN fallback (loss of power or IP service to unit - with quiescence to normal operations)
- Advanced inbound and outbound call routing
- Independent configurable dial plans - up to eight
- Force PSTN disconnection
- Sequential dialing support

VoIP to PSTN Authentication and Routing Features

- VoIP to PSTN gateway enable/disable
- VoIP caller authorization method (none, PIN, HTTP digest)
- VoIP PIN max retry setting
- One-stage dialing enable/disable
- VoIP caller ID pattern matching
- VoIP access allowed caller list (no further authentication)
- VoIP caller PIN and associated dial plan

PSTN to VoIP Authentication and Features

- PSTN to VoIP gateway enable/disable
- VoIP caller authorization method (none, PIN, HTTP digest)
- Ring through to FXS enable/disable
- Ring-through tone - configurable
- Caller ID (Bellcore Type 1) for VoIP service access

- Caller ID enable/disable

- PIN max retry settings

- Access allowed caller list (no further authentication)

- Caller PIN and associated dial plan

- Least-cost routing (via outbound VoIP - Line1 dial plan)

FXO Behavior Features

- VoIP answer delay timer

- PSTN answer delay timer

- VoIP PIN digit time-out timer

- PSTN PIN digit time-out timer

- PSTN to VoIP call max duration timer

- VoIP to PSTN call max duration timer

- PSTN ring-through delay timer

- PSTN dialing delay timer

- VoIP DIG refresh interval timer

- PSTN ring time-out timer

PSTN Disconnection Detection Features

- CPC (removal of tip/ring voltage momentarily)

- Polarity reversal

- Long silence (configurable time setting)

- Disconnect tone (such as reorder tone)

- Silence threshold

International Control Features

- FXO port impedance - configurable to 16 settings

- Ring frequency - configurable

- SPA to PSTN and PSTN to SPA gain settings

- Ring frequency - maximum setting

- Ring validation time setting

- Tip/ring voltage adjustment setting

- Ring indication delay setting

- Operational loop current minimum value

- Ring time-out setting

- On-hook speed setting

- Ringer impedance setting

- Line-in-use voltage setting

Specifications

Table 1 contains the specifications and package contents for the Cisco SPA3102 Phone Adapter with Router. Table 2 compares the various Cisco Small Business Phone Adapters.

Table 1.   Specifications for the Cisco SPA3102 Phone Adapter with Router

Specifications	
Data networking	• MAC address (IEEE 802.3) • IPv4 (RFC 791) upgradeable to v6 (RFC 1883) • Address Resolution Protocol (ARP) • DNS A record (RFC 1706), SRV record (RFC 2782) • Dynamic Host Configuration Protocol (DHCP) client (RFC 2131) • DHCP server (RFC 2131) • Point-to-Point Protocol over Ethernet (PPoE) client (RFC 2516) • Internet Control Message Protocol (ICMP) (RFC 792) • TCP (RFC 793) • User Datagram Protocol (UDP((RFC 768) • Real Time Protocol (RTP) (RFC 1889, 1890) • Real Time Control Protocol (RTCP) (RFC 1889) • Differentiated Services (DiffServ) (RFC 2475), type of service (ToS) (RFC 791, 1349) • VLAN tagging 802.1p • Simple Network Time Protocol (SNTP) (RFC 2030) • Upload data rate limiting - static and automatic • Quality of service (QoS) - voice packet prioritization over other packet types • Router or bridge mode of operation • MAC address cloning • Port forwarding

Voice gateway	• Session Initiation Protocol (SIP) v2 (RFC 3261, 3262, 3263, 3264)
	  ◦ SIP proxy redundancy - dynamic via DNS SRV, A records
	  ◦ Reregistration with primary SIP proxy server
	• SIP support in Network Address Translation (NAT) networks (including Serial Tunnel [STUN])
	• Secure (encrypted) calling via prestandard implementation of Secure RTP
	• Codec name assignment

Voice algorithms	• G.711 (A-law and μ-law) • G.726 (16/24/32/40 kbps) • G.729 A • G.723.1 (6.3 kbps, 5.3 kbps) • Dynamic payload • Adjustable audio frames per packet
Fax capability	• Fax tone detection and pass-through (using G.711) • Fax pass-though (using G.711) • Dual-tone multifrequency (DTMF): in-band and out-of-band (RFC 2833) (SIP info) • Flexible dial plan support with interdigit timers and IP dialing • Call progress tone generation • Jitter buffer - adaptive • Frame loss concealment • Full-duplex audio • Echo cancellation (G.165/G.168) • Voice activity detection (VAD) with silence suppression • Attenuation/gain adjustments • Flash hook timer • Message waiting indicator (MWI) tones • Visual MWI (VMWI) via frequency shift keying (FSK) • Polarity control • Hook flash event signaling • Caller ID generation (name and number) - Bellcore, DTMF, European Telecommunications Standards Institute (ETSI) • Music on hold client • Streaming audio server - up to 10 sessions

Security	• Password-protected system reset to factory default
	• Password-protected administrator and user access authority
	• Provisioning/configuration/authentication:
	◦ HTTPS with factory-installed client certificate
	• HTTP digest - encrypted authentication via MD5 (RFC 1321)
	• Up to 256-bit Advanced Encryption Standard (AES) encryption
Provisioning, administration, and maintenance	• Web browser administration and configuration via integrated web server
	• Telephone keypad configuration with interactive voice prompts
	• Automated provisioning and upgrade via HTTP, Trivial File Transfer Protocol (TFTP)
	• Asynchronous notification of upgrade availability via SIP NOTIFY
	• Nonintrusive, in-service upgrades
	• Report generation and event logging
	• Stats in BYE message
	• Syslog and debug server records - per-line configurable
	• Per line and purpose configurable syslog and debug options
Physical interfaces	• Two 100BASE-T RJ-45 Ethernet ports (IEEE 802.3) - 1 WAN, 1 LAN
	• 1 RJ-11 FXS phone port - for analog circuit telephone device (tip/ring)
	• 1 RJ-11 FXO phone port - for a Telco or PBX connection
FXS	Ring voltage: 40-55 VRMs configurable
Subscriber line interface circuit (SLIC)	• Ring frequency: 10-40 Hz
	• Ring waveform: trapezoidal and sinusoidal
	• Maximum ringer load: 3 ringer equivalence numbers (RENs)
	• On-hook/off-hook characteristics:
	◦ On-hook voltage (tip/ring): -50V nominal
	◦ Off-hook current: 25 mA min
	◦ Terminating impedance: 8 configurable settings including North America 600 ohms, European CTR21
Regulatory compliance	• FCC (Part 15 Class B), CE, ICES-003, A-Tick certification, RoHS
Power supply	• DC input voltage: +5V DC at 2.0A max
	• Power consumption: 5W
	• Switching type (100-240V) automatic
	• Power adapter: 100-240V, 50-60 Hz (26-34 VA) AC input
Indicator lights/LEDs	Power, Internet, Phone 1, Phone 2
Documentation	• Quick installation, user, and configuration guides
	• Administration guide - service providers only
	• Provisioning guide - service providers only

Environmental	
Dimensions	3.98 x 3.98 x 1.10 in. (101 x 101 x 28 mm)
Unit weight	5.11 oz. (0.145 kg)
Operating temperature	32º to 113º F (0º to 45º C)
Storage temperature	-13º to 185º F (-25º to 85º C)
Operating humidity	10% to 90% noncondensing, operating and nonoperating

Package Contents
• Cisco SPA3102 Phone Adapter with Router
• Power adapter
• 1 RJ-45 Ethernet cable
• 1 RJ-11 telephone cable
• Quick installation guide

Product Warranty
1-year limited hardware warranty with return to factory replacement and 90-day limited software warranty

Many specifications are programmable within a defined range or list of options. Please see the SPA Administration Guide for details. The configuration profile is uploaded to the Cisco SPA3102 at the time of provisioning.

Table 2.   Cisco Phone Adapter Comparison Chart

Model	Service Lines	Active Calls	3-Way Conferences	PSTN (FXO) Connection
SPA2102	2	4	2	0
SPA3102	2	3	1	1

The SPA2102 and SPA3102 support up to two sessions using G.729. The SPA3102 supports two incoming services (proxy registrations) and an unlimited number of outgoing VoIP services.

Cisco Limited Warranty for Cisco Small Business Series Products

This Cisco Small Business product comes with a 1-year limited hardware warranty with return to factory replacement and a 90-day limited software warranty. In addition, Cisco offers software application updates for bug fixes and telephone technical support at no charge for the first 12 months following the date of purchase. To download software updates, go to: http://www.cisco.com/go/smallbiz.

Product warranty terms and other information applicable to Cisco products are available at http://www.cisco.com/go/warranty.

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